

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
30 January 2003 (30.01.2003)

PCT

(10) International Publication Number
WO 03/009622 A1

(51) International Patent Classification⁷: H04Q 7/32

(21) International Application Number: PCT/TR01/00033

(22) International Filing Date: 20 July 2001 (20.07.2001)

(25) Filing Language: English

(26) Publication Language: English

(71) Applicant and

(72) Inventor: ATILLA, Mustafa [TR/TR]; Bilkent Merkez
Kampüs, Beytepe Köyü No. 3, Bilkent, 06533 Ankara
(TR).

(74) Agent: ANKARA PATENT BUREAU LTD.; Sehit
Adem Yavuz Sokak 8/22, Kizilay, 06440 Ankara (TR).

CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,
MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK,
SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA,
ZW.

(84) Designated States (regional): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian
patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European
patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE,
IT, LU, MC, NL, PT, SE, TR); OAPI patent (BF, BJ, CF,
CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD,
TG).

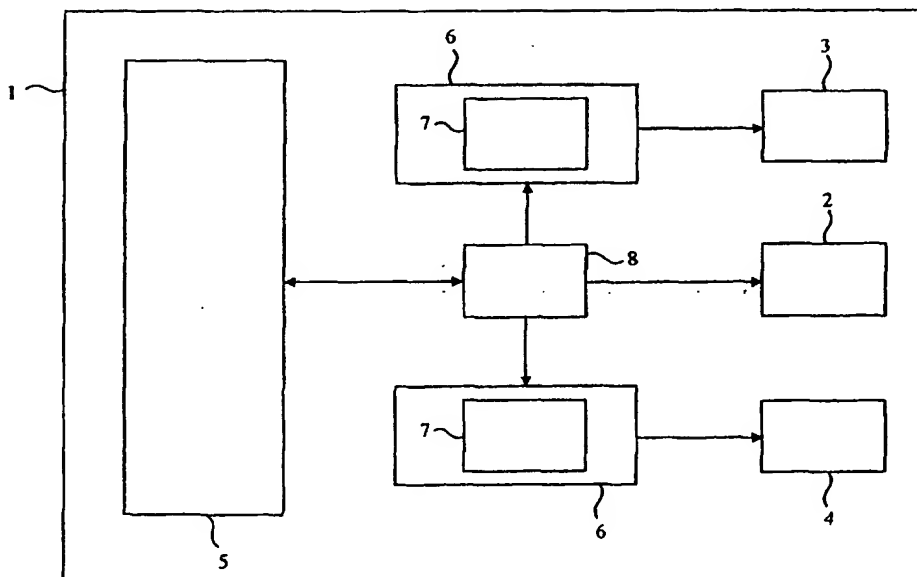
Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(81) Designated States (national): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,

(54) Title: METHOD AND DEVICE FOR SELECTING THE MOST SUITABLE AND THE MOST COST-EFFECTIVE NETWORK



(57) Abstract: The method according to the invention and the stationary and mobile station device used for the implementation of said method, are used to enable the telephone calls made by stationary or mobile phone, to be performed over the most suitable network and tariff. By means of said method and device, the telephone calls are realized by selecting the most cost-effective network among the stationary or mobile networks that the user is authorized to use and directing it to said network, in order to provide the call to made at a lower price over this selected network.

WO 03/009622 A1

**METHOD AND DEVICE FOR SELECTING THE MOST SUITABLE AND
THE MOST COST-EFFECTIVE NETWORK**

5 The present invention is related to carrying out the telephone calls made either from home or from the office, over the most economical tariff.

 In the state of art, devices that are connected to a base station and which have the capacity to make a selection between the mobile and stationary (base) network, are known. However in such devices, a selection operation with respect
10 to tariffs and promotions cannot be made and said devices are connected to the commonly used stations, not to individual or standalone devices.

 In US Patent No. 6,185,4113, being one of the prior art documents, mobile stations supporting a selection operation between different mobile networks and the selection methods utilized in the mobile station, are disclosed. However, the
15 patent describes that support only mobile networks.

 Also, US Patent No. 5,425,085 relates to a device which can be connected directly into the phone line for routing phone calls made from a first phone along the least cost path of the telephone network to a second phone. But, the patent covers devices plugged into fixed telephony networks only.

20 In the state of art US Patent No. 6,067,452 technique for routing the mobile calls in a cost-effective way is described. However, the technique is focused on routing the call through the shortest terrestrial path and again involves only GSM network in coordination with satellites. Also, this technique does not provide reduction in call costs.

25 The object of the present invention is to provide the sound and data communication performed from home or from office by using a telephone or other

means of communication connected to the (base) stationary telephone network, over the most appropriate and most cost-effective network using the different price information related to the mobile networks.

The method and device for selecting the most suitable and the most cost-effective network, realized to attain said object of the invention have been
5 illustrated in the attached drawings,

Figure 1, is the flow diagram of the device for selecting the most suitable and cost-effective network,

The components shown in the drawings have been given reference
10 numerals as listed below:

1. Stationary and mobile communication device
2. User interface unit
3. Stationary (base) network interface unit
4. Mobile network interface unit
- 15 5. Programmable tariff (schedule) memory unit
6. Network selecting unit
7. Switching circuit
8. Central Processing Unit (CPU)

The stationary (base) and mobile communication device (1) used for the
20 implementation of said method according to the present invention consists of an integral circuit. Said circuit provided in the stationary and mobile communication device (1) is used to enable the correspondences performed over the base or mobile network, to be made over the most suitable and cost effective network. By virtue of this invention, the sound or data communication performed by using a

telephone can be made by selecting the most cost effective network among the fixed or mobile network through which the user is authorized to make a call, and by directing said communication to the selected network in order to provide a communication with a lower price over said network.

5 The integrated circuit forming the stationary (base) and mobile communication device (1), consists of the user interface unit (2), stationary (base) network interface unit (3), mobile network interface unit (4), programmable tariff memory unit (5), network selecting unit (6), switching circuit (7) and the central processing unit (8).

10 The user interface unit (2) is a unit that provides the information/data exchange between the user and the stationary (base) and mobile communication device (1). Said unit consists of the key set, loudspeaker, microphone, LCD display screen, a touch-sensible screen provided on the stationary (base) and mobile communication device (1) and the earphone –microphone set etc. that are
15 in conformity with the wireless communication technologies (such as Blue tooth) not provided on the station device. By using said elements, data can be transferred to the device or presented to the user. The user can enter the data by means of audio, visual or touch-sensible routes. The stationary (base) and mobile communication device (1) can provide the user the audio or visual data. The
20 integrated circuit of the invention can be used for the computer-based devices (such as Set-Top Box, PC calling card, PC modem, etc.). In this case the user interface unit (2) is integrated to said device.

 The stationary network interface unit (3), provides the access of the stationary (base) and mobile communication device (1) to such stationary (base)
25 networks as POTS, ISDN, DSL etc authorized to communicate.

 Said mobile network interface unit (4) provides the access of the stationary (base) and mobile communication device (1) to the services (e.g. SMS, cell transmission, CCIP, CLIR, Headset profile, etc.) presented by the stationary and mobile networks (e.g. GSM, UMTS, DECT, Blue tooth, etc) to which the user is

authorized to access, and enables to emergency call through the networks (e.g. GSM, UMTS etc) that supports the emergency call feature, to which the user is not subscribed.

5 The stationary and mobile network interface units (3 and 4) enable the stationary (base) and mobile communication device (1) to make and to receive a call.

The programmable tariff memory unit (5) contains a database wherein such information as the name of all stationary, mobile or wireless networks to which the user is authorized to access, the normal price tariffs of each network, 10 the price tariffs with discount, low-price hours, network counters, location/position information, emergency telephone memory, and information about the total time of calls made over the selected network, are present.

A network-selecting unit (6) takes place between the central processing unit (8) and the stationary/mobile networks. Said unit (6) realizes the selection of 15 the stationary and mobile networks by means of the switching circuit (7).

The central processing unit (CPU) (8) is the unit that controls the operation of the assembly of the units and it supports the standards of the networks which the user is authorized to use and to which it establishes connection.

In the method for selecting the most suitable and cost-effective network, 20 the stationary (base) and mobile communication device (1) is accessed by means of the user interface unit (2) by entering the telephone number to be called by the user. The number to be called, which has been entered by using the user interface unit (2), and the duration of the call, the time and price of the calls made up to that moment over the existing networks, and the list of the networks that could be 25 accessed at the moment of call, are examined by the central processing unit (8). This is performed among the data that are continuously updated in the tariff memory unit (5), the data entered by the user when specifying his intention for a call, and among the preferred options that have been predetermined by the user.

The central processing unit (8) selects the one with the lowest price among the accessible networks at the moment of call and decides the network over which the call will be made. For the decision process, the network to which the number to be called belongs, the time of call, the distance of the number to be called if known
5 or extracted from the region code of the number called, special prices of the networks, parameters specifically set the user (e.g. inhibited networks, preferred networks (pirate) special numbers, etc.) are taken into consideration. At the beginning of the call process, information related to the network, selected by the method of selecting the most suitable and cost-effective network, is transferred to
10 the network-selecting unit (6). By using the switching circuit (7) present in the network-selecting unit (6), the target telephone number is called by means of the stationary and mobile network interfaces (3 and 4) of the selected network, over the selected network.

The method for selecting the most suitable and cost-effective network
15 remains operative during the call period and in case a different network becomes more suitable and more cost-effective than the network through which the call is realized, it informs the users, audio-visually, of this news network. Furthermore the total price is displayed visually throughout the call period.

Thus, by selecting the most efficient network with respect to accessibility
20 and cost-effectiveness, the telephone intended to be called can be accessed over the selected network. The present invention may be integrated to the stationary or mobile communication devices (e.g. stationary telephone devices used at home or office, mobile telephones (DECT, Blue tooth etc), and may be used in computer-based telephones (e.g. set Top Box PC Modem, PC call cards).

CLAIMS

1. A stationary and mobile communication device (1), that consists of a user interface unit (2) that provides the required information for audio-and data calls; a stationary network interface unit (3) that provides access to the stationary networks through which the user is authorized to communicate; a mobile network interface unit (4) that provides access to the mobile networks through which the user is authorized to communicate; a programmable tariff memory unit (5) comprising a database wherein such information as the name of all stationary, mobile or wireless networks to which the user is authorized to access, the normal price tariffs of each network, the price tariffs with discount, low-price hours, network counters, location/position information, emergency telephone memory, and information about the total time of calls made over the selected network, are present; a switching circuit (7) and a network selecting unit (6) which realizes the selection of the stationary and mobile networks by means of the switching circuit (7); and a central processing unit (8) that controls the operation of the assembly of the units and supports the standards of the networks which the user is authorized to use and to which it establishes connection, characterized with an integrated circuit that can be placed in stationary, mobile, wireless or computer-based means of communication.
2. The most suitable and cost-effective network selection method that is used in a stationary and mobile communication device (1), which consists of the following steps:
 - a) entering the telephone number to be called, by the user, by means of the user interface unit (2),
 - b) examining the number to be called, which has been entered by using the user interface unit (2), and the duration of the calls made before over available

networks, the time and price of the calls made up to that moment over the existing networks, and its location information,

- 5 c) comparing thus obtained information with the information present in the data base of the programmable tariff memory unit (5), deciding and selecting the network that can provide access to the telephone number to be called, entered by the user, in the most suitable and cost-effective manner,
 - d) transferring information related to the network, selected by the method of selecting the most suitable and cost-effective network, to the network selecting unit (6),
 - 10 e) calling the target telephone number, over the selected network, by using the information transferred to the network selecting unit (6), and by using the switching circuit (7) present in the network selecting unit (6), by means of the stationary and mobile network interface (3 and 4) of the selected network.
3. The most suitable and cost-effective network selection method according to
- 15 Claim 2, characterized in that, during the calling period, in case a different network becomes more suitable and more cost-effective than the network through which the call is realized, it informs the users audio-visually of this new network.
4. The most suitable and cost-effective network selection method according to
- 20 Claim 2, characterized in that, the total price is displayed visually throughout the call period.
5. The most suitable and cost-effective network selection method according to
- 25 Claim 2, characterized in that, the network information present in the programmable tariff memory unit (5) are updated after the termination of the call.

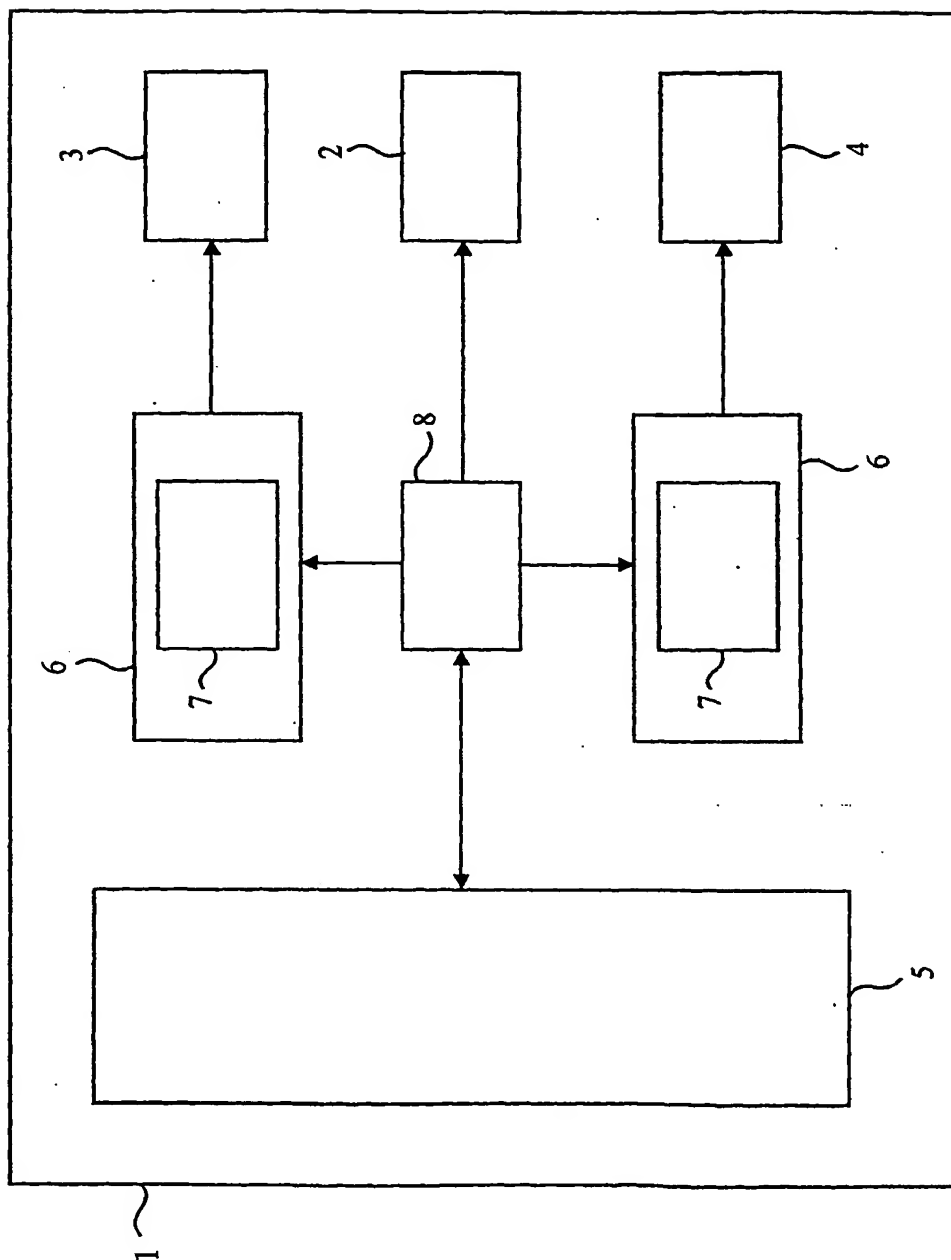


Figure 1

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04Q7/32

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 98 11760 A (SALM PETER V D ;ERICSSON TELEFON AB L M (SE)) 19 March 1998 (1998-03-19) abstract page 3, line 26 -page 5, line 27 page 7, line 13 -page 8, line 5 figure 2	1-5
Y	US 5 862 203 A (WULKAN ITZHAK ET AL) 19 January 1999 (1999-01-19) abstract column 1, line 50 -column 2, line 4 column 11, line 15 -column 12, line 19 column 12, line 40 -column 14, line 50 figures 6,9,10	1-5

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

S document member of the same patent family

Date of the actual completion of the international search

8 March 2002

Date of mailing of the international search report

27/03/2002

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax (+31-70) 340-3016

Authorized officer

Rabe, M

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 98 58512 A (SIEMENS AG ;ROLM SYSTEMS (US)) 23 December 1998 (1998-12-23) abstract page 10, line 17 -page 17, line 23 figure 1 -----	1,2,4
A	US 5 963 863 A (BERGGREN VIKTOR) 5 October 1999 (1999-10-05) abstract column 4, line 8 - line 49 column 5, line 66 -column 7, line 65 figure 1 -----	1,2
A	EP 1 096 825 A (CARDILLO ANDREA ;SARASSO STEFANO (IT)) 2 May 2001 (2001-05-02) abstract column 2, line 55 -column 4, line 33 figure 1 -----	1,2

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9811760	A	19-03-1998	AU 723719 B2	07-09-2000
			AU 4702897 A	02-04-1998
			WO 9811760 A2	19-03-1998
			EP 0925699 A2	30-06-1999
			US 6343220 B1	29-01-2002
US 5862203	A	19-01-1999	US 5799072 A	25-08-1998
			US 5764741 A	09-06-1998
			AU 3782697 A	11-05-1998
			WO 9808335 A1	26-02-1998
			AU 705826 B2	03-06-1999
			AU 6368396 A	26-02-1997
			CA 2227569 A1	13-02-1997
			EP 0865706 A2	23-09-1998
			WO 9705749 A2	13-02-1997
			JP 2000501903 T	15-02-2000
			US 6078652 A	20-06-2000
WO 9858512	A	23-12-1998	US 6185413 B1	06-02-2001
			CN 1260938 T	19-07-2000
			EP 0990357 A1	05-04-2000
			WO 9858512 A1	23-12-1998
US 5963863	A	05-10-1999	AU 2838897 A	27-06-1997
			BR 9611850 A	09-03-1999
			CA 2239068 A1	12-06-1997
			CN 1207854 A	10-02-1999
			EP 0864240 A1	16-09-1998
			WO 9721315 A1	12-06-1997
EP 1096825	A	02-05-2001	EP 1096825 A1	02-05-2001